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PENICILLIN IN THE CLINICAL LABORATORY*

By MARIAN A. BAKER, M.T. (A.S.C.P.)

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The molds had always been regarded as unwelcome intruders in the laboratory because of their persistent contamination of culture media. The chance observation by Professor Alexander Fleming[1] that a Petri dish inoculation of staphylococci exhibited inhibition of growth in an area surrounding a mold contaminant, initiated research which resulted in the present therapeutic application of the antibiotic substance known as penicillin.

Less than four years have elapsed since Chain, Florey and associates[2] published a report on penicillin as a chematherapeutic agent, but in this short space of time a voluminous literature has accumulated. The original application of penicillin, as an inhibitory agent to aid in cultural isolation, is still useful in the laboratory. Clinical application in a variety of disease conditions, however, has far overshadowed this original use. Penicillin, combining the desirable qualities of low tissue toxicity and activity in high dilution, is among the most powerful antibacterial agents known today for a large group of pathogenic organisms.

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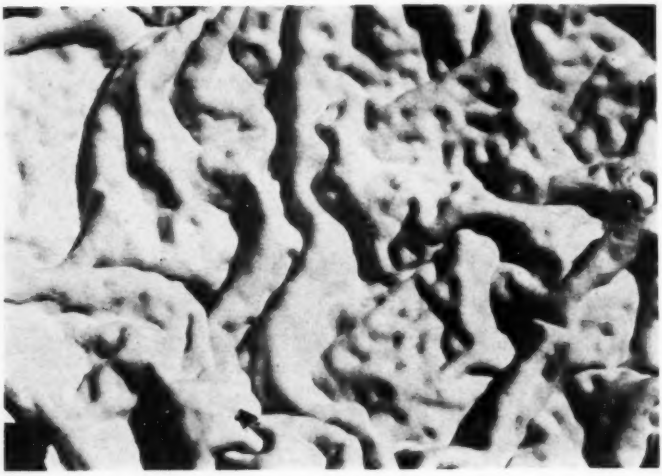
* *Presented at the Annual Convention of the American Society of Medical Technologists, Chicago, June* 10, 1944.

Despite the fact that penicillin must be produced at present by controlled culture of mold, supplies sufficient to meet the needs of civilians, as well as those in the armed forces, are becoming available. Difficulties of large-scale production are the very minute yield of penicillin produced by *Penicillium notatum* and the instability of penicillin in impure solution. Production methods now in use are: Flask Culture, in which a strain of the mold is grown on the surface of liquid media; Deep Vat Culture, in which the mold

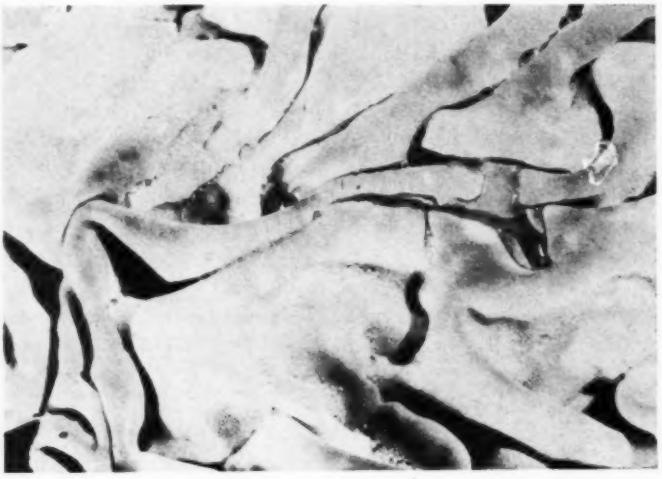


Penicillium notatum on fourth day of growth

is propagated as a submerged culture; and Bran Culture, in which the mold is grown on nutrient-moistened bran spread thinly in trays or processed in a rotary drum.

The formation of penicillin by *Penicillium notatum* depends upon the proper strain, the condition of the inoculum, the carbohydrate concentration, the pH of the medium, the source of nitrogen, the duration of incubation and the influence of traces of the heavy

metals (such as zinc).[3] Penicillin suitable for clinical use is refined from crude penicillin by a chemical process resulting in a metallic salt. Reports have appeared on the use of sodium, calcium, ammonium and barium salts. Sodium penicillin, which has received the widest application, is a labile substance which is very hygroscopic in impure form, easily destroyed by alteration in the pH of



Mold at peak of penicillin production, ready for harvest

the surrounding medium, sensitive to oxidizing agents, less sensitive to reducing agents.[4] Penicillin solutions must be stored at temperatures of 5°C or less as activity is rapidly lost at higher temperatures.

Assay.—A National Standard, consisting of 3 Gm. of pure crystalline penicillin, has been set up by the Food and Drug Administration. Its value has been established at 1,650 units per milligram. It is to be expected that standardization will soon be based upon this National Standard. For the present, however, standardization is still based upon the Oxford unit (the amount of penicillin, in a

given volume, which completely inhibits the growth of a test strain of Staphylococcus aureus). Theoretically this unit rests upon the basis of a definition, but in practice it rests upon comparison, either directly or indirectly, with the original standard. The criterion of potency is inhibition of bacterial growth by penicillin preparations which, in certain media, is proportional to concentration. The methods differ only in the means used to measure this inhibition. Two of the procedures most commonly employed are the Cup Plate Method and the Serial Dilution Method. Results are determined by comparison with known-potency standards or are based upon a previously determined order of activity. A number of factors influence results: depth of medium; stock culture of the test organism; pH of the medium; relationship between rate of diffusion of the penicillin and growth of the test organism; concentration of the inoculum.[5] In such tests the use of identical procedures and conditions for both known and unknown penicillin dilutions are of primary importance.

The Cup Plate Method consists of glass, porcelain, plastic or aluminum cylinders placed on top of an inoculated agar surface and then filled with the solution to be tested. A simplification of this method is the substitution of filter paper discs, saturated with the samples, for the cups.[6] The diameter of the zone of inhibition about the cylinder or disc, compared with the zones of inhibition produced by dilutions of penicillin of known potency, provide the basis for calculation of the strength of the unknown solution. The Serial Dilution Method consists of varying dilutions of the unknown in a constant inoculum of the same test organism in a constant medium, either liquid or solid, compared with similar inoculations containing known penicillin concentrations. The results may be determined in a number of ways. Among these are tubidimetric readings, hemolysis of red cells in broth inoculated with hemolytic streptococci, or color change resulting from production of acid.

Absorption and Excretion. — Penicillin may be administered locally, subcutaneously, intramuscularly, intravenously, intrathecally, intrapleurally, intra-articularly or injected into cavities.[7] Oral or

rectal administration are unsatisfactory because of the inactivating effect on penicillin of acid and *E. coli*. Upon intravenous administration there is a high initial concentration followed by an abrupt fall, with urinary excretion of 37-99% of the administered dose, the greatest amount being excreted during the first hour. Absorption and excretion are rapid after intramuscular injection, slow after subcutaneous. Maximum serum concentrations, with identical dosage, are highest with intravenous, lowest with subcutaneous administration. Absorption from body cavities is delayed, with slow excretion from the kidneys. Fluid aspirated from pleural and joint cavities, 22 and 13 hours after injection, show considerable amounts of the penicillin remaining.[7] Intrathecal injection of penicillin results in slow excretion in normal patients, much more rapid excretion in meningitis patients. Blood of meningitis patients shows a significant concentration of penicillin for several hours after intrathecal injection, while that of normal subjects does not. In the presence of renal failure, penicillin is slowly excreted, with the result that high concentrations are maintained in the blood after intravenous administration.[8]

Clinical Application.—Penicillin is an extremely powerful antibacterial agent and is essentially non-toxic. The form now in use will inhibit sensitive organisms in dilutions of from 1:50,000,000 to 1:100,000,000 and morphological effects on streptococci may be observed in dilutions up to 1:250,000,000. It is primarily effective against Gram positive cocci and bacilli and against Gram negative cocci. The quantity necessary to kill staphylococci is greater than that required for other pyogenic cocci. Menigococci and gonococci are much more sensitive to penicillin than are pneumococci or hemolytic streptococci. While different organisms vary greatly in their susceptibility, different strains of the same organism also exhibit wide variations in susceptibility. About 4% of the staphylococci encountered are penicillin resistant. The following table lists, in the light of present knowledge, some of the more commonly known pathogens with respect to their *in vitro* penicillin susceptibility:

SUSCEPTIBLE STRAINS:	INSUSCEPTIBLE STRAINS:
Pneumococcus	*Hemophilis influenzae*
Streptococcus hemolyticus	*Escherichia coli*
Staphylococcus	*Eberthella typhosa*
Neisseria gonorrheae	*Salmonella paratyphi A and B*
Neisseria menigitidis	*Salmonella typhimurium*
Neisseria catarrhalis	*Shigella dysenteriae*
Streptococcus viridans	*Bacillus proteus*
Bacillus subtilis	*Brucella abortus*
Bacillus anthracis	*Brucella melitensis*
Cornebacterium diphtheriae	Enterococci
Clostridium tetani	Anaerobic streptococci
Clostridium welchii	*Pseudomonas pyocyanae*
Clostridium septique	*Bacillus prodigiosus*
Clostridium histolyticum	*Mycobacterium tuberculosis*
Clostridium oedematiens	*Micrococcus flavus*
Clostridium sporogenes	*Klebsiella pneumoniae*
Clostridium sordellii	*Vibrio cholerae*
Actinomyces bovis	Monilia
Lactobacillus	*Leptospira ictherohaemorrhagiae*
Cryptococcus hominis	*Pasteurella pestis*

Mode of Action.—Numerous experiments to determine the mode of action of penicillin in the body have been carried out. Results of these would indicate that it may act either as a bacteriostatic agent or induce a true bactericidal effect. Profound changes in morphology and growth characteristics are produced. A principal effect of penicillin seems to be interference with reproduction, but apparently the ability to destroy organisms occurs only if active multiplication is taking place.

Acute systemic infections and infections in well vascularized soft tissues respond more promptly and require a smaller amount of penicillin than do more chronic infections, especially if the latter occur in relatively avascular tissue such as bone.[9]

Penicillin In the Laboratory.—From the standpoint of the clin-

ical laboratory worker, tests concerned with the use of penicillin may be roughly divided into two classes: the use of penicillin as an aid to cultural isolation of bacteria; and tests which give information useful in treating patients with penicillin. Taking these up in that order: Fleming[1] originally used penicillin to aid in the isolation of *Hemophilus influenzae*. Since that time crude filtrates of penicillin have become valuable aids to cultural isolation techniques.[10, 11] For example:

> Ordinary blood agar plates are prepared and inoculated either before or after solidification of the agar. About 0.2 cc. (6 drops) of a crude filtrate of penicillin are spread over one half of the plate by means of a bent glass rod. When spreading, start where the inoculum is lightest and spread toward the heavier inoculum. One half of the plate thus becomes a selective culture on which staphylococci, streptococci, pneumococci, the diphtheria group, pathogenic Neisseriae, etc., are inhibited and *B. pertussis, Hemophilus influenzae,* coliform bacilli, etc., can grow out. The other half of the plate is an ordinary culture. If similarly prepared plates using 2 drop quantities of 1-3,000 Gentian Violet or 1-1,000 Potassium Tellurite are inoculated at the same time, differential isolation, without the use of specially prepared media or a large number of plates, becomes a simple matter.

Another example of the employment of penicillin as an aid in cultural isolation is its use to inhibit staphylococci in cultures from acne lesions.

> Glucose broth (pH 6.8) is boiled to drive off gases, cooled and inoculated with pus from acne lesions. Penicillin is added in strength twice that previously shown to inhibit the growth of staphylococci. Hot sterile vaseline is run on the surface to a depth of one-half inch to exclude air. After about 60 hours of incubation, growth of acne bacilli becomes perceptible and there is a heavy growth in four days. Pure cultures without transfers are thus easily accomplished.

Growth and preparation of crude penicillin is relatively simple and can be carried out in any bacteriological laboratory. Dehydrated media, requiring only the addition of water, is now obtainable from several commercial sources. If non-prepared medium is preferred, the Czapek Dox medium, or preferably, a corn steep liquor medium* may be used. Cultures of *Penicillium notatum* may be obtained from the American Type Culture Collection, 3900 Reservoir Road, Washington, D. C., or from the Northern Regional Research Laboratory, Fermentation Division, Peoria, Ill. It is important to maintain the penicillin-productivity of the seed spores.

The Original spores are seeded onto Honey Agar Slants.** After six days the spores are washed off with 10 cc. of sterile physiological saline. One cc. of this suspension is used per tube of soil. (Soil is prepared by sifting through a fine sieve and autoclaving on three successive days.) Let inoculated soil tubes stand at room temperature. One generation of mold will grow before the soil dries completely. Stopper with sterile rubber corks, paraffin and store at room temperature.

For use, suspend one soil tube in approximately 50 cc. of sterile physiological saline. Shake and plant 1 cc. on a Honey Agar Slant. Incubate for six days at 21°C. When sporulation has taken place, the mat will be a greyish blue-green. Pour sterile, fat-base talc containing glass beads over the mold mat and shake to loosen spores. Extreme dryness is essential. The resultant mixture of talc and spores is used to seed bottles of sterile liquid medium. Incubate the seeded bottles at 21-22°C, exposing the greatest surface. Allow for exchange of metabolic gases in the bottles. Air circulation is recommended.

The pH of the medium is about 4-4.5 at the start of fermenta-

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* Corn Steep liquor (50% solids). approximately 8% by volume of final medium; $NaNO_3$, 3 Gm./L; KH_2PO_4, 0.5 Gm./L; $MgSO_4$, 0.25 Gm./L; $ZnSO_4$, 0.044 Gm./L; Carbohydrates (lactose, 4%; starch, 2%; brown sugar, 2.4%).

** 5 Gm. Peptone, 1%; 14 Gm. Agar, 2.5%; 470 cc. H_2O. Autoclave 15 minutes to melt agar. Add 30 cc. (6%) honey and mix. Adjust pH to 6.5-7.0 with NaOH. Tube, autoclave exactly 10 minutes at 240° F. Slant and cool.

tion. Fermentation is regarded to have produced a maximum amount of penicillin when a pH of 7.2-7.8 is reached in from 7 to 8 days. At the end of the incubation period, shake the culture thoroughly and decant the liquid aseptically into sterile containers. Chill to 2°C. Adjust the pH to 5.5-6 with a dilute acid (1M H_3PO_4 or H_2SO_4). Filter to clarify, being careful to keep the solution cold. Freeze the filtrate until ready for use. The solution will remain active for one to two weeks.

A carbon (NuChar C—190N, Darco G—60 or Norite A) may be used to purify the penicillin from the crude broth by charcoal adsorption and elution. Use 3% carbon by weight. Agitate for 15 minutes, filter, discarding the filtrate. Elute with water containing 3% amyl acetate, using an amount equal to, or one-half that of, the original volume. Distill under vacuum at not above 23°C to remove the amyl acetate. Freeze the concentrate until used. In order to test the potency of the crude or purified filtrates, various dilutions of the solution may be tested by the Cup Plate or Serial Dilution techniques.

The usual clinical laboratory tests now used in connection with infectious processes, such as hematological, serological and chemical procedures, are as necessary when penicillin is used as the therapeutic agent, as they are with other methods of treatment. For example, in a case of streptococcal bacteremia, initial high dosage may be expected to result in a marked return toward normal of the white blood count and either a drop or complete remission of the bacteremia. However, failure to maintain adequate dosage for a sufficient period of time will be reflected by changes in these favorable laboratory results.

As with the sulfa drugs, bacteria may develop a relative "fastness" to penicillin so that the antibiotic is no longer effective unless much larger doses are used. If a satisfactory response to penicillin is not being obtained under treatment, cultural studies will determine whether or not the organism has developed such fastness. There have been a number of reports[12, 13] of *in vitro* development of resistance to penicillin, but in actual practice, fastness has rarely been encountered.[14] When it does occur, there is usually a corresponding loss of virulence of the organism.[15]

It is probable that excretion tests will be rarely requested because, unless there is interest in a particular research problem, it is not necessary to know the penicillin content in the blood or excreta of patients under treatment.[16] Information regarding higher concentrations of penicillin may be readily obtained but tests will not show, *in vitro,* the biologic activity of material containing only traces of penicillin. This unmeasured activity may be sufficiently high to profoundly influence the pathogen *in vivo.*

Because penicillin therapy is expensive, it is desirable to use it only for those conditions in which it is effective and to use just sufficient quantities for an adequate period of time. In determining these factors, the laboratory plays an important role. In order to treat properly with penicillin, it is helpful to know the penicillin response of the particular offending organism as well as variability in the response of different organisms. Such studies can be carried out by isolation of the pathogen and testing its susceptibility to various strengths of penicillin *in vitro.*

Other Antibiotics.—Penicillin is only one of a series of antibacterial agents elaborated by various molds and fungi. Microorganisms of many types produce antibacterial agents, as do many members of the plant and animal kingdom.[17] Extensive investigations of these are being carried out. Known antibiotic substances vary greatly in composition. The following seven groups are now recognized.[14]

1. Polypeptides and proteins, including tyrothricin, lysozyme, actinomycetin and notatin.
2. Sulfur-bearing compounds comprising gliotoxin and several others.
3. Pigments, which include pyocyanin, hemipyocyanin, prodigiosin, chlororaphin, toxoflavin and actinomycin.
4. Lipids and lipoid-like bodies which comprise a number of compounds, only a few of which, such as pyocyanase, have been investigated.
5. Quinones and quinone-bearing compounds, including citrin, penicillic acid and fumigatin.

6. Organic bases such as streptothricin and proactinomycin.

7. Agents known to be produced by various micro-organisms but not yet isolated or studied in detail.

Penicillin, Past and Future.—Although we consider the clinical use of penicillin a recent therapeutic advance, it is possible that this is only a modern application of an old remedy. A London apothecary, John Parkinson, published a volume in 1640 which described the use of "mosse from dead mens sculles" to cure wounds.[18] It is entirely possible that this "mosse" owed its alleged value to antibiotic activity.

A number of things may be anticipated in the future of penicillin. New techniques for manufacturing, standardization and clinical or laboratory use, will result from isolation of the pure substance. Penicillin is now being studied for the treatment of syphilis. It has been observed[19] that sarcoma cells, grown with normal fibroblasts, are selectively damaged by penicillin. This observation might lead to a new conception of treatment for sarcoma. Some tuberculosis-retarding action has been observed[20] in guinea pigs and chick embryos with the use of aqueous solutions of ether extracts of *P. notatum* cultures. Experimental work indicates the effectiveness of penicillin against murine typhus rickettsiae,[21] relapsing fever[22] and Weil's disease.[23]

Penicillin is not a cure-all but it has already proven effective against many pathogens. Future study may well show it and the other antibiotic substances under investigation to be effective against an even broader range of disease-producing organisms.

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LIVER FUNCTION TESTS

By A. R. K. MATTHEWS, B.A., M.D.,* *Rockford, Illinois*

Liver Function Tests

The liver has many functions. These are not necessarily related to each other. Some are well established as to their physiological behavior, others are not so well understood and await further classification. In order to approach the subject of liver function tests in a rational way it is important to consider first what these functions are. Only those which are reasonably well recognized are listed.

Functions of Liver

(1) Formation and excretion of bile.
(2) Conversion of carbohydrates to glycogen and storage of same.
(3) Deaminization of proteins and formation of urea.
(4) Elimination of toxic substances or conversion to non-toxic state.
(5) Synthesis of prothrombin.
(6) Synthesis of blood plasma proteins.
(7) Storage of erythrocyte maturing factor.
(8) Possible esterification of cholesterin.
(9) Storage of enzyme activators.

When the liver is damaged any of these various functions may become unequally defective. Furthermore the liver has a large reserve capacity and may suffer considerable damage before a failing function is recognized. Therefore a normal function test does not mean that there is no liver damage, and any single test, since it estimates only one function, may give misleading information unless checked by tests evaluating other functions as well.

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Many tests have been devised for the laboratory investigation of the liver and biliary tract. It is not strange that some confusion and perplexity should exist as to what tests are most helpful and reliable. This of course enters into the realm of the clinical pathologist but certainly the medical technologist has a natural interest in the subject. These tests may be listed according to the particular functions with which they are concerned.

Laboratory Investigations

(1) *Pertaining to bile pigment or bilirubin*:
- (a) Qualitative diazo reaction—van den Bergh.
- (b) Icterus index.
- (c) Quantitative serum bilirubin.
- (d) Bilirubin in feces.
- (e) Bilirubin in urine.
- (f) Quantitative urobilinogen of feces and urine.

(2) *Pertaining to carbohydrate storage*:
- (a) Level of fasting blood sugar.
- (b) Galactose tolerance test.

(3) *Pertaining to deaminization of proteins*:
- (a) Blood urea level.

(4) *Pertaining to eliminating and detoxifying activity*:
- (a) Bromsulphthalein test.
- (b) Hippuric acid test.

(5) *Pertaining to various miscellaneous functions*:
- (a) Prothrombin determination.
- (b) Serum albumin—globulin ratio.
- (c) Total blood cholesterol and percentage of esters.
- (d) Erythrocyte macrocytosis.
- (e) Cephalin-Cholesterol test.
- (f) Blood phosphatase level.

The van den Bergh test is a color reaction that distinguishes between two types of bile pigment. Bile pigment originates from the hemoglobin of disintegrated erythrocytes. Before it is processed by the liver cells it appears to be linked with a protein molecule.

This type of bile pigment will give a delayed or an indirect van den Bergh, and these reactions occur in jaundice of the hemolytic type or when there is liver damage sufficient to prevent the liver from excreting the bile pigment brought to it by the blood stream. On the other hand, bile pigment which has been processed and excreted by the liver cells seems to undergo some alteration in its chemical structure. If by reason of bile duct obstruction it is reabsorbed into the blood it will give an immediate van den Bergh reaction. Thus the test should help to differentiate between retention jaundice and obstructive or resorptive jaundice. The possible reactions may be designated as follows:

(1) Immediate—color change occurs as soon as serum and diazo reagent are mixed. Maximum color is attained in less than two minutes. This reaction is considered to indicate obstructive jaundice.

(2) Delayed—color change begins after two minutes and reaches maximum gradually after thirty minutes. This reaction is considered to indicate hemolytic or non-obstructive hepatogenous jaundice.

(3) Indirect—no color obtained until after addition of alcohol. This reaction is considered to have the same significance as the delayed reaction.

(4) Biphasic—an immediate color change but maximum not reached until later than two minutes. This reaction probably is a combination of immediate and delayed types, and possibly signifies the presence of both types of bile pigment due to obstruction of bile ducts and liver cell damage. It should be remembered that normal serum will give an indirect reaction and possibly a delayed reaction.

The quantitative serum bilirubin determination actually estimates the amount of bile pigment in the blood. It is usually referred to as a quantitative indirect van den Bergh since the determination depends on a comparison of the colors obtained with this type of diazo reaction using serum as the unknown and a known bilirubin standard. Recently work has been published[1] which presents methods

for quantitive determinations of both direct and indirect reacting bile pigment. This may develop important differentiating diagnostic criteria.

The examination of the feces for hydrobilirubin or bilirubin is of value as an indication of whether or not bile is entering the duodenum from the common bile duct. For this purpose the Huppert test or the better known Schmidt test may be used. Of these two the former seems most sensitive.

The examination of the urine for bilirubin is also of value since that type which gives an immediate van den Bergh appears in the urine, while that type which gives a delayed or indirect van den Bergh ordinarily does not pass through the kidney. The tests commonly used for this examination are either not sensitive enough or inaccurate. Here again the Huppert test is quite satisfactory, also the Diazo Spot test.

The quantitative estimation of urobilinogen in urine and feces is generally considered to be of great value, particularly so as regards the urine where an increase is expected even in early liver damage. Urobilinogen is formed in the intestinal tract from the bilirubin present in the intestinal contents. Most of it is excreted with the feces but some is absorbed into the blood, a small portion of this is normally excreted in the urine while the major portion is re-formed by the liver into bilirubin. If, for any reason, the liver is unable to perform this activity the urobilinogen accumulates in the blood and is excreted by the kidney so that an increased amount appears in the urine. In our laboratory we have used both the Sparkman[2] and Watson[3] techniques for these determinations. We have found both to be satisfactory for the urine estimation but prefer the Watson method for the feces, having found it difficult to match the colors of the standard in the Sparkman method.

The value of a fasting blood glucose determination is limited but since the liver appears to control the maintenance level of blood glucose it seems that a hypoglycemia is very often an indication of a disturbed liver function.

The study of the carbohydrate storage function is carried out by the galactose tolerance test. The patient is given a measured

amount of galactose which should be stored by the liver; if not, it is eliminated and found in the urine. Thus an excess amount in the urine is an index of damaged liver function. This test is generally considered to be failing in sensitivity.[4]

The deaminization of proteins and formation of urea thereby is an important liver function. If it fails the blood urea level may be lowered.

The eliminating and detoxifying activities are the basis for two well established function tests. The bromsulphthalein test has been used extensively and is generally considered to be one of the most useful tests available.[5] Liver damage is revealed by the persistence of the dye in excessive amounts in the blood. This test is most valuable in the absence of bile duct obstruction. The hippuric acid synthesis test is considered to be about parallel to the dye test in sensitivity. There are two methods, one in which the sodium benzoate is given orally, one where it is given intravenously, the latter[6] is preferable being more accurate and shorter. The liver synthesizes hippuric acid from the sodium benzoate and it is ultimately excreted in the urine. If it fails to appear in the urine in normal quantities it serves as an indication of liver damage. The estimation of the amount present has been improved by the addition of ammonium sulfate to the urine.[7]

The prothrombin determination is important since it is evident that the liver has an important role in the synthesis of this substance. Also, the absence of bile in the intestinal tract appears to reduce the assimilation of vitamin K, which is essential in the formation of prothrombin. Thus there are good reasons for observations on prothrombin, and particularly in prospective surgical patients with liver or biliary tract disease because of the possibility of serious hemorrhage.

The serum albumin-globulin ratio may be altered in liver disease.[8] It appears that the albumin level is chiefly affected and that low values are encountered while the globulin level remains normal or may be raised.

The total blood cholesterol and percentage of esterified form provide another means of testing liver function. It is maintained that 60 to 70% of the total amount should be in the forms of

esters[9, 10] and that values below this are found in liver disease. We have found the Leiboff apparatus and method[11] to be a very suitable means of making these determinations.

The cephalin-cholesterol flocculation test[12] has recently received considerable attention. It is a simple test to perform and the readings are readily made. It has been offered as a means of differentiating obstructive from hepatogenous jaundice, and furthermore a positive reaction is considered to indicate the presence of liver damage. Various authors[13, 14, 15, 16, 17] recommend it quite strongly as being the most sensitive single test yet introduced. It appears that the flocculation depends on some alteration in serum globulin and that this reflects liver damage.

Since the liver is the storage location for the factor which is necessary for the maturation of erythrocytes it follows that liver damage may result in an anemia or hypocythemia with macrocytosis. This is a feature that should not escape detection and may frequently provide a valuable diagnostic lead.

The liver also appears to store factors which influence the activity of certain enzymes such as phosphatase. It has been shown[18] that the level of serum alkaline phosphatase is comparatively low in various forms of hepatogeneous jaundice while in common duct obstruction it is increased.

There are many other tests which have been introduced and used to evaluate liver function. Among these mention should be made of the Takata-Ara reaction and the Weltmann serum coagulation test.[19] Here again, as with the cephalin-cholesterol test, variations in serum proteins associated with liver disease are probably responsible for the reactions.

It is well to remember that no single test should be relied on to form an opinion as to the quality of the liver function. A combination of several tests offers a much better evaluation. In the presence of jaundice all those tests which pertain to bile pigment are particularly indicated, also the cephalin-cholesterol test, and the prothrombin and phosphatase levels. In those without jaundice the urine urobilinogen, the hippuric acid synthesis, the prothrombin level, the bromsulphthalein excretion, the percentage of cholesterol

esters, and the cephalin-cholesterol test seem to offer the best possibilities. In any event these problems still call for thoughtful consideration and careful and varied investigations. There are still no good short-cuts to worthwhile laboratory findings and no stereotyped patterns of interpretation.

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BOOK REVIEWS

TROPICAL NURSING: By A. L. Gregg, M.D., M. Ch., D. T. M. & H. Lond., L. M. Rotunda Hospital. Member of Associate Staff of, and Lecturer to Nurses at the Hospital for Tropical Diseases, London, Lecturer on Tropical Diseases, Westminster Hospital Medical School. Philosophical Library, New York, New York, 1944, Pp. 185. Second Edition. Price $3.00.

The unmistakable extension of interest in tropical medicine inspired this volume of 185 pages on the special clinical entities found in the tropics and how to care for them.

A chapter on general hygiene and clinical descriptions of the common tropical diseases with their care and treatment comprise the subject matter.

The index is adequate and the presentation throughout is sufficiently comprehensive to meet its purpose.

MANUAL OF HUMAN PROTOZOA: By Richard R. Kudo, D.Sc., Associate Professor of Zoology, The University of Illinois. Charles C. Thomas, Springfield, Ill. Pp. 125. Price $2.00 postpaid, 1944.

Consonant with enlarging interest in protozoal pathogens, formerly well recognized but largely regarded as of special interest only, the author of this volume presents essential information on this subject so that "he who runs may read" about it.

In paper coverage this book is not pretentious, the reading material and index being confined to one hundred twenty-five pages. The salient facts relating to detecting and identifying human protozoa is the scope claimed by the author and in this respect his accomplishment deserves approval.

The subject material embraces protozoa of the digestive tract, keys to their genera and species, technic for their identification and methods of differential diagnosis. The second major section is protozoa of the circulatory system and those found in muscle and the reproductive organs. There are 29 clear and informative illus-

trations with index and a reference section to more elaborate sources of data on the subject.

This brief compilation with its wide coverage and precise description should make it useful to students, technicians, busy physicians, public health officials and all and sundry who need a ready reference manual about human protozoan disease.

PHYSICAL FOUNDATIONS OF RADIOLOGY: By Otto Glasser, Ph.D., Professor of Biophysics and Head of Department of Biophysics, Cleveland Clinic Foundation, Cleveland, Ohio; Edith H. Quimby, Sc.D., Associate Professor of Radiology (Physics), College of Physicians and Surgeons, Columbia University, New York; Lauriston S. Taylor, Ph.D., Chief of X-Ray Section, National Bureau of Standards, Washington, D. C.; J. L. Weatherwax, M.A., Philadelphia General Hospital and Graduate School of Medicine, University of Pennsylvania, Philadelphia. Paul B. Hoeber, Inc., New York and London, Pp. 426, Price $5.00, 1944.

A collaborative compilation of data by authors of ability usually produces a presentation of merit. In this instance the discussions of an intricate science and the elucidation of the principles of radiation physics impress the reviewer as a classical example of successful co-authorship.

The opening chapter on "Historical Milestones in Radiology" ought to create interest, inasmuch as modern radioactivity is said to stem from experiments by Gilbert in 1600. This chapter is followed by a discussion of the fundamental concepts of matter, then in orderly arrangement are presented the nature of radiations, electricity, magnetism, assembly of x-ray generators, explanation of x-ray tubes, the production, nature and use of x-rays and radium with other items of practical clinical interest.

There is an index to names appearing in the text and one of subjects. The numerous technical drawings assist the reader, also. References to publications are appended to each chapter. This book can be recommended to the student of radiation as a source of technical information but at the same time it is written with sufficient clarity to be understandable to medical personnel not profoundly versed in the subject.

NEWS AND ANNOUNCEMENTS

ANNUAL SESSION CHICAGO
June, 1944

PRESIDENT'S ADDRESS

By MRS. EVELYN N. JARDINE, M.T. (A.S.C.P.)

Each individual who becomes the president of an organization assumes certain responsibilities. In becoming your president, my interpretation of these responsibilities assumed are: *First*: to support to the best of my ability the ideals laid down by the preceding presidents and officers as outlined in the constitution. *Second*: to add some measure of strength and purpose to the organization. *Third*: to stand before the assembled members and give a brief account of the office before turning it over to the succeeding president. One might add that this "third" be done as quickly as possible to permit getting on to the good things waiting.

In support of the ideals laid down by the constitution certain decisions had to be made due to unusual conditions, one being to hold a meeting of only officers and directors last year and hold a convention this year. It seemed that we should not travel and take the time while so busy to carry on a convention. It certainly would be very wrong to do so if one attended only the social side of a convention. There have been very few technologists to do this in the past, judging by the attendance at the scientific sessions. This proving that, by far, the majority come to learn and thereby benefit themselves and the institution employing them. This convention offers one of the few opportunities to refresh our memories from student days and have new procedures presented. We are meeting for these personal benefits and it behooves us to do all in our power to accept conditions as we find them, uncomplaining, and to even assist the hotel and railroad in any manner possible.

Aside from the point of much-needed scientific information to improve our work, there were other reasons, pertaining to the health

of the organization; namely, that, as a group, we are newly organized, we are still in critical years of development, and we are such a rapidly moving group that to fail to meet for a second year in succession presented a danger. It so happens that even in one year so many technicians have changed address, to say nothing of their name, that an officer working from a distance soon finds what few contacts she remembers from the convention or has made are no longer available. This affects the *Journal* and the strength of the organization to such an extent that our efficiency and usefulness decreases. This last year has been difficult. To drift another year would be to lose ground which might never be regained.

Another strong, perhaps the strongest reason for this convention at this time is that the constitution requires that the officers shall be elected by the House of Delegates at the Annual Session. It is not healthy for this or any organization to keep the same people in office over an indefinite period. Each officer has some special ability that lends strength to a group such as we are in the American Society of Medical Technologists. When that individual has rendered that service which his gift makes possible, then it is time for another person with other talent to take over the reins. Maintenance of high ideals and a steady flow of ideas and energy can only be maintained by this change in personnel. To elect officers required that the House of Delegates meet. To maintain the power of government in the House of Delegates it is essential that it does meet. It did not seem wise to drift another year with the possibility of changes in the personnel with no replacements in sight. Many details which I shall not bother you with will be placed before the House of Delegates at their session. You may put your mind at ease regarding the essential need from a business as well as an educational point of view that this convention must be held at this time.

My second obligation was to give some measure of strength and purpose to the progress of the organization. There should be results to speak louder than words here. I feel that I have done very little. I have sincerely tried to build up the American Society of Medical Technologists from the angles that are essential. First, we need more registered technicians. Each one here at this meeting

must be brought to realize that it is up to you individually to make the time and opportunity to speak in the High Schools where you are located. To college students if they are available. Emphasize the requirements for registry and the manner to go about it properly. The office of the registry will supply booklets and literature. This is where we start. Once we have enough technicians to supply the essential needs of the hospitals then those especially equipped will be able to do research work. Many pathologists are deterred from experimental work because they have not the technical personnel to assist in the details. Many technicians, personally capable of valuable research, are obliged to rush through heavy schedules without the time to work out the techniques with proper detail. When this ends and the technician has the time to prove her ability along scientific research, then our branch of the profession will rise to a goal somewhat nearer to its aspirations. This goal cannot be reached without work on the part of those who are founding this profession. I called up high schools and asked to speak to those interested in science. In two instances, after explaining to the superintendent about our work, I was introduced as the woman who ran the nurses school at the hospital and would tell them all about the Nurse Cadet Program. You might have like experiences that will bring home to you how desperately the young people need information if they are to know that this field of endeavor exists. Please leave this convention knowing that you are responsible for information reaching the high schools where you are located, and for the colleges if available. As we increase the number of technicians then we will be released for special work and greater service.

As we are able to increase the number of registered technicians we should be able to increase the number who join the American Society of Medical Technologsits. Each year we do solicit membership through the mail sent to registrants through the registry office. We have no way of knowing how many members are in our ranks due to that project. We must again add to our individual responsibility the seeking out of every registered technician near and urge that she take her place in the national group. For my own guidance I had a list of fourteen states that were chartered societies

of the American Society of Medical Technologists. The name of the treasurer of each of these groups was made available and I have written to each of these societies and urged that a membership drive be conducted. Membership has increased through these efforts but I have no way of knowing which is the most effective. I can say that the most effective way would be presumably through the state groups who have personal contact. Here is our second project that is entirely up to those individuals here today. Organize your state if there is no organization at present. If there is a state group, take an active part in its life and assume as your special objective the chartering of that society. I need not take the time to illustrate the strength that this society would have were every registered technician a member and every state group was affiliated. Then the officers of the American Society of Medical Technologists could contact technicians throughout the nation. Then educational projects could be efficiently organized to benefit us all through the individual state groups.

In a glance, the field of Medical Technology has, through the Registry and the American Society of Clinical Pathologists, been able to take its place in the field of medical science. As an individual becomes qualified through a national board examination he also becomes eligible to become a member of the American Society of Medical Technologists. In addition to this, he is expected to become a member of the individual state group and to take an active part in both societies. This is exactly what the other branches of medicine have outlined for themselves as a full and complete professional life. We are just now well-embarked on this road. There is much to do yet. If this war has accomplished good, one may say that it has taught you and me to act, not drift along. We know beyond any shadow of a doubt that if you want a thing accomplished, do it yourself. Do not wait for someone to start — the busiest people will find time to do a little more. These things we have learned the hard way. Let us use it to the advancement of our profession. Everyone sitting here today is potential state and national officer material. You are the organization and it is up to you to make it successful to accomplish the needs of your profession, yourself, and the future.

I have one other message to leave with you, as my idea for success for the future. I have tried and I believe in some measure succeeded in cementing between the Registry and The American Society of Clinical Pathologists a degree of understanding and friendship. For two years we have worked together, each maintaining his own sphere of operation, each lending aid to the other whenever asked, and I do believe we have been mutually benefited. The Clinical Pathologists are pleased that we are standing on our own feet, taking our place in the field of medical science. Let us plan and watch the future in such a manner that we increase in strength and independence but guard against any element that would use this power and independence to cause any breach between ourselves and the world of medical science. We all know that no group has stood for greater service, greater sacrifice, greater achievement than the medical men. We all know the pride and loyalty with which they work and cooperate. We have been given the opportunity to take our stand as a small part of this field—let us continue to increase in size and strength—let us make this profession demand the same respect as other branches—let us carry on in our chosen profession with increasing loyalty and professional dignity.

MINUTES OF THE HOUSE OF DELEGATES MEETING

The House of Delegates of the American Society of Medical Technologists met at Club Medinah, Chicago, June 12, 1944, at 2:25 p. m. The session was called to order by the President, Mrs. Evelyn Jardine.

The Credential Committee reports that inspection found the credential of the delegates in order. Mrs. Jardine requested the Secretary to take the roll call. There were twenty-nine delegates and officers representing eighteen states.

Miss Elizabeth Current moved that the discussion of a topic be limited to fifteen minutes and each speaker to three minutes on an individual topic. Motion seconded and passed.

Mrs. Jardine called for the reading of the minutes of the 1943 Executive Session in Chicago. Miss Lyle moved that the minutes be accepted as read. There were many seconds and the motion

passed.

The Report of the Executive Secretary by Mr. Conlin, which was based upon the auditors report, Haskins & Sells. From this report the membership, as of the close of business 5-5-44, disclosed that there were six hundred and twenty members, eighty-five old members dues unpaid for 1943-44; in addition, twenty-four members serving in the Armed Forces were retained as having paid their dues in full for the duration of the war and six months thereafter. Sixty-four applications were held in files, pending completion.

Report of *Journal* by Mr. Conlin, also based on audit of Haskins & Sells.

Report of Treasurer by Miss Tate which was verified by auditors of Ferry & Vorrhies.

Miss Lyle moved that these reports be accepted as read, seconded by Miss Kortuem and carried.

Report of Advisory Board by Miss Lyle, Chairman. This report revealed the approval and acceptance of three new affiliated societies. Mr. Herring moved that this report be accepted as read. Seconded and passed.

Mrs. Jardine called for the report of the Nominating Committee by Miss Lyle, Chairman. In this report the committee recommended that the Society accept the retiring president an unopposed candidate for office of Board of Directors, in order to make use of the knowledge gained during term of office just completed.

Sister Alcuin moved that we proceed to vote without further discussion. Miss Lehman seconded. Motion withdrew.

It was moved by Sister Alcuin that the report of the Nominating Committee be accepted as read and proceed to vote without further discussion. Seconded and carried.

Mrs. Jardine appointed the Tellers: Edna Luneke, Clara Kruse, Doris Bradway, Lilly Ford. The election proceeded.

Mr. Herring took the floor in order to report to the members of the House of Delegates concerning the trust fund which was offered to the Society, by an unknown donor, at the meeting in 1943. He communicated the decision of the Society to the donor. Preparations were to be made in the will when death occurred suddenly, before provisions for this fund were completed. Therefore this

grant was not received by this Society.

Mrs. Jardine gave a report of the efforts in interest of obtaining commissions for technologists in the Armed Forces. Mrs. Jardine appeared before members of the Committee of Military Affairs to present our desire to serve and clarify the positions of the registered medical technologists in regard to the Armed Forces. Mrs. Jardine presented to this Committee the qualifications of the medical technologists registered by the American Society of Clinical Pathologists. The Committee explained what was necessary to obtain commissions, namely, the passage of a bill in Congress which is being formulated in proper legal form for presentation to Congress. This Committee was favorably impressed by our qualifications. We have a congressman to present this bill and three members of the House to speak in favor also a senator to present the bill in the Senate and give it favorable comment. The A.S.M.T. will be notified of the approximate date of the introduction of this bill and State Societies and individual members will be expected to contact their congressmen and members of the Committee of Military Affairs, signifying our desire to have the bill passed in Congress. Miss Baker moved that Mrs. Jardine be empowered to continue the propect to completion, namely, to continue all efforts toward commissioning the medical technologist registered by A.S.C.P. in the Armed Forces of the United States. Seconded and carried.

Miss Matthaei moved that the A.S.M.T. should stand the expenses for notification to the State Societies when this bill is presented. Miss Baker amended the motion, to include all expenses incurred in the campaign to obtain commissions for the medical technologist registered by A.S.C.P. be paid by the A.S.M.T.. This motion and amendment were seconded and carried.

Report of the Tellers by Miss Kruse: President Elect: Mary Eichman; Recording Secretary: Sister Mary Alcuin Arens; Treasurer: Loretta Laughlin; Board of Directors: Evelyn Jardine, Louis Herring; Advisory Board: Dorothy Meyer.

The suggested changes in the application forms for membership were discussed at this time. Miss Lyle moved that in Article I Section I By-Laws the words, "shall each bear the written endorsement of two active members in good standing" be stricken out. This motion was seconded by Miss Stanley. Vote carried.

Miss Lyle introduced the subject of the activities and reappointment of members of the Board of Counsellors. Discussion followed. A new Board of Counsellors is not due to be appointed as clarified by Article VII, Section III, By-Laws.

Miss Grace Ballard asked for the opinion of the delegates in regard to state licensure. Discussion pro and con followed.

Miss Claussen, representing the Minnesota Society, wished to be on record saying that more members would join the A.S.M.T. if dues were lowered. Discussion followed and it was concluded that the Society would not maintain its standards with dues any less than at the present time.

Miss Kortuem offered the following suggestion for future conduct of conventions: that a registration fee for members and guests be abolished, also the scientific sessions and exhibits each have a different time designated for members to attend. Discussion followed.

Mr. Conlin called for a discussion of the opening caused by the expiration of the term of the Executive Secretary. Miss Claussen gave explanation of this matter to the delegates.

Miss Lyle made a motion that we approve the sum of five hundred dollars for the publication of the *Journal* of the A.S.M.T. This was seconded by Miss Lehman and passed.

Mrs. Jardine announced that nominations for members of the Nominating Committee were in order. The following members were nominated from the floor: Clara Kruse, Doris Bradway, and Rachael Lehman.

Miss Kortuem moved we adjourn. Motion seconded by Miss Laestar and passed 5:30 p.m.

Respectfully submitted,

Mary F. Eichman,
Recording Sect.

Approved by Mrs. Evelyn Jardine.

MINUTES OF THE MEETINGS OF THE BOARD OF DIRECTORS

The Board of Directors met at the Club Medinah, Chicago, Illinois, on June 11th, 1944, at 8 a.m. Those present were: Evelyn Jardine, Rose Matthaei, Hermine Tate, Frieda Claussen, Henrietta

Lyle, John Conlin, and Mary Eichman. The meeting was called to order by the President, Mrs. Jardine. The minutes of the Executive Sessions of June 5th, 1943, were read and approved.

Mr. John Conlin moved that the one hundred dollars allocated at the last executive meeting be distributed accordingly, twenty-five dollars supplementing the fifty dollars, awarded by the Office of the Registry, fifty dollars to the second award, and twenty-five dollars to the third award. Seconded by Miss Claussen and passed.

It was moved by Mr. Conlin that seventy-five dollars be allocated for Exhibit awards: fifty dollars to the first and twenty-five dollars to the second selection. Motion seconded by Miss Lyle and carried.

Discussion of the expiration of the term of the Executive Secretary followed. It was suggested that the President contact the absent members of the Board of Directors regarding this matter. Meeting adjourned.

June 11th, 1944, 4 P.M.

Mrs. Jardine re-called the meeting to order. Those present were: Rose Matthaei, Hermine Tate, Frieda Claussen, Henrietta Lyle and Mary Eichman.

The matter before the Board of Directors is that of the appointment of an Executive Secretary due to the expiration of the term of the present Executive Secretary, Mr. John Conlin. There is not a quorum present to vote on this matter and the members present request the President to wire the absent members for their vote on the following: For Executive Secretary, Miss Hermine Tate or the reappointment of Mr. Conlin. Miss Matthaei moved the meeting adjourn. Seconded and passed.

June 12th, 1944, 11 P.M.

The meeting was called to order by Mrs. Jardine. Those present were: Evelyn Jardine, Rose Matthaei, Hermine Tate, John Conlin, Frieda Claussen, Louis Herring, Loretta Laughlin, Henrietta Lyle, and Mary Eichman.

The matter for decision at this time is the following: a. total adjournment of any meeting in 1945; b. meeting of officers and directors in 1945 or c. a general convention in 1945.

Due to the fact that a quorum of the Board of Directors of the present term is not present, Mrs. Jardine relinquished the chair to

Miss Matthaei, the incoming President. A quorum of the Board of Directors, effective July 1st, 1944, was established.

Mr. Herring moved that this meeting be held as of 7-1-44. Seconded and passed.

It was moved by Mr. Herring that it is the opinion of those present that a convention be held in 1945, in same city or place as the American Society of Clinical Pathologists hold their meeting and that it immediately follow the close of their session by opening the next day, provided, that day is not Sunday. Seconded by Miss Laughlin and carried unanimously. Miss Matthaei moved that we resume the meeting recessed in order to contact the absent members of the Board of Directors. Miss Claussen seconded and carried.

Mrs. Jardine asked for the appointment of the Executive Secretary and presented the following: John Conlin, Hermine Tate.

The vote of those present and the absent members by wire, result: Hermine Tate 7, John Conlin 1.

It was decided that all discussion pertaining to the appointment of the Executive Secretary be excluded from the records and only the result of said discussion be embodied in the minutes. This was agreeable to all present.

As of July 1st, 1944, Miss Matthaei in chair. Mr. Herring moved that the transition of publication of the *Journal* from Wines Publishing Company to an unnamed publisher, be allowed to proceed at the discretion of those publishers as rapidly as possible and that such transfer be started and completed at a date not later than six months from July 1st, 1944. Seconded and carried.

Miss Laughlin moved that the Society make it possible for Miss Tate to go to Detroit, in order to familiarize herself with the procedure and to look over the equipment on hand, at her discretion. It was seconded by Mr. Herring. Carried.

On motion of Mr. Herring the meeting adjourned 12:30 a.m.

Respectfully submitted,

Mary F. Eichman,

Recording Sect.

REPORT OF ADVISORY BOARD, 1943-1944

During the year 1943-1944, the Advisory Board has approved the materials sent in by three societies applying for affiliation with the American Society of Medical Technologists. These societies, which are now affiliated with us are the Niagara Frontier Association of Medical Technologists, the Ohio Society of Medical Technologists, and the Arkansas Society of Medical Technologists.

The societies previously affiliated have renewed their charters.

Contacts have been made during the past year to encourage formation of other societies and affiliation of groups already in existence. We are hoping to have these groups become affiliated during 1944-1945.

The Advisory Board wishes to urge continuance of the excellent work done by the society as a whole and by individual members during the past year in securing additional members. Although no definite new projects have been launched by the Board during the past year, we are actively interested in being of service to the society and its members in the enlarging of our membership rolls and lists of affiliated societies.

Respectfully submitted,

Henrietta M. Lyle,
Chairman.

June 12, 1944.

REPORT OF THE AWARDS COMMITTEE

The following is the report of the Awards Committee for the Convention of the American Society of Medical Technologists held in Chicago, June 10th, 11th and 12th, 1944.

The pathologists serving on this committee were Dr. Kano Ikeda, Charles T. Miller Hospital, St. Paul, Minn.; Dr. Mary Swan, Scientific Pathological Laboratories, Chicago, Illinois, and Dr. J. P. Tollman, Nebraska Medical School, Omaha, Nebraska.

Sixteen papers were sent to me prior to the convention which were read and judged by the pathologists. The scientific exhibits were judged by the pathologists the morning of June 12, 1944.

Fifty dollars was offered by the Board of Registry, which is an

annual prize, to the individual presenting the best paper. A total of one hundred seventy-five dollars was voted by the Board of Directors of the Society to be distributed at this Convention to the three best papers and to the two best exhibitors. The usual medals, gold, silver and bronze were also awarded. Awards were presented at the banquet, Monday evening, June 12, 1944.

Awards for Scientific Papers:

"Use of the Chick Embryo in the Study of Cryptococcoid Infection," Miss Pauline Kurachi, Colorado State Hospital, Pueblo, Colorado, Gold Medal, fifty dollars from the Board of Registry and twenty-five dollars from the Society.

"Laboratory Diagnosis of Food Poisoning with Study of Outbreaks Occurring in Louisiana," Miss Lucille Godelfer, Dept. of Health, New Orleans, Louisiana, Silver Medal, and fifty dollars from the Society.

"Routine Bacteriological Detection of Gonococci in a Public Health Laboratory," Mrs. Lucille Wallace, City Health Dept., Tulsa, Oklahoma, Bronze Medal and twenty-five dollars from the Society.

Awards for Scientific Exhibits: Miss Jessie Lex, Peoria, Illinois, "Metabolism," fifty dollars from the Society.

Wisconsin Association of Medical Technologists, second award, twenty-five dollars from the Society.

Respectfully submitted,

Olga F. Nelson, M.T.,
Chairman, Awards Committee.

The Ninth Annual Assembly of the International College of Surgeons will be held on October 3, 4, 5, 1944, at the Benjamin Franklin Hotel in Philadelphia, Pa. The program will be devoted to War, Rehabilitation and Civilian Surgery.

This Assembly, sponsored by the United States Chapter of which Thomas A. Shallow, M.D., F.A.C.S., F.I.C.S., of Philadelphia, is President, has set up its Arrangement Committee with Dr. Rudolph Jaeger as General Chairman. Dr. Jaeger will be inducted as the incoming President of the United States Chapter at the Convocation on Wednesday evening, October 4. The new president came to

the Jefferson Medical College from Denver, Colo., where he specialized in Neurosurgery.

Eminent surgeons in Government, Military and Civilian practice have been invited to attend and present papers pertinent to surgery in their particular field of endeavor.

The Chairmen of the various committees are: Dr. William Bates, President-elect of the Pennsylvania Medical Society, is chairman of the Program Committee; Dr. John Royal Moore, Philadelphia, Exhibits; Dr. Moses Behrend, Philadelphia, Publicity; Dr. Leonard D. Frescoln, Philadelphia, Hospital Clinics; Dr. William L. Martin, Philadelphia, Registration; Dr. Ernest F. Purcell, Trenton, N. J., Convocation; Dr. John E. Loftus, Philadelphia, Entertainment; Dr. Harold D. Corbusier, Plainfield, N. J., Rehabilitation; Dr. Benjamin Shuster, Philadelphia, Housing; Dr. William F. Whelan, Motion Pictures. The medical profession is invited to attend the Assembly and its sessions.

SERVICE ROLL

Members of the American Society of Medical Technologists in the service of their country:

Lt. Col. Arthur T. Brice
Major J. A. Wood
Major Theodore Keiper
Capt. Walter J. Dell
Capt. William J. Thaler
Ralph M. Carrel, 1st Lt. SnC
Lt. Sydney Grimmo
Lt. Timothy L. Duggan
Frederick W. Hindley, 1st Lt. Sanitary Corps.
Lt. Margaret E. Johnston, W.A.C.
Lt. Margaret M. Nichols
Lt. Wm. J. Noble, Jr., Sn. C.
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STATE AND LOCAL SOCIETIES

●

THE INDIANA STATE SOCIETY OF MEDICAL TECHNOLOGISTS

Affiliated with

AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS

1943-1944

Regular meeting. Annual. Spring.

OFFICERS

Virginia Sue Alley, M.T. (ASCP).....President

Hazel M. Childs, M.T. (ASCP).....Secretary

Indianapolis City Hospital, Locke and Tenth Street,
Indianapolis, Indiana

THE OHIO SOCIETY OF MEDICAL TECHNOLOGISTS

(Akron, Ohio)

Affiliated with

AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS

1943-1944

Regular meetings: Semi-annual. Spring and Fall.
War-time meetings: Annual. Spring.

OFFICERS

Kathryn Teeplem, M.T. (ASCP).....President

Akron City Hospital, Akron, Ohio

Mary Benedict Clark, M.T. (ASCP).....Secretary-Treasurer

Nichols General Hospital, Louisville, Ky.
Address also: 301 McCready Ave., Louisville 6, Ky.

WISCONSIN ASSOCIATION OF MEDICAL TECHNOLOGISTS

Affiliated with

AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS

1943-1944

Regular meetings: Semi-annual. May and October.

OFFICERS

Alice Thorngate, M.T. (ASCP) ..... President
Sr. M. Corona Rohlik, M.T. (ASCP) ..... President-Elect
Grace Ballard, M.T. (ASCP) ..... Treasurer
Mrs. Elizabeth Kullman, M.T. (ASCP) ..... Secretary
2460 South 59th Street, Milwaukee 14, Wisc.

WISCONSIN ASSOCIATION OF MEDICAL TECHNOLOGISTS

MILWAUKEE DISTRICT

Affiliated with

AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS

1943-1944

Regular meetings: Second Tuesday of each month.

OFFICERS

Dorothy Zoeller, M.T. (ASCP) ..... President
Mary Anna Fox, M.T. (ASCP) ..... Vice-President
Margaret Foley, M.T. (ASCP) ..... Treasurer
Esther Lemont, M.T. (ASCP) ..... Secretary
2618 North Summit Avenue, Milwaukee 11, Wisc.

Name of State or Local Society	A.S.M.T. Affiliation	Meetings	Secretary's address
Caddo Parish Society of M. T.			Harriet H. Cypert, M.T.
1943-'44	non-aff.	monthly	Barksdale Field Hosp.
Pres. A. Merlin McKinnon			Barksdale Field, La.
California Association of M. L. T.			Florence Connelly, M.T.
(Santa Barbara Chapter) 1943-'44	non-aff.	monthly	317 West Pueblo Str.
Pres.—Grace P. Butera			Santa Barbara, Calif.
Chicago Society of M. T.			Ada Meloy, M.T.
1944-'45	aff.	monthly	1575 Florence Ave.
Pres.—Dorothy Laestar			Evanston, Ill.
Colorado Society of M. T.			Edna Mains, M.T.
1943-'44	aff.	monthly	2432 West Argyle Pl.
Pres.—Allyne E. Lawless			Denver, Colo.
District of Columbia Society of M. T.			Evelyn F. Ballou, M.T.
1943-'44	aff.	monthly	4105 Third Street N. W.
Pres.—Zanerian E. Funk			Washington, D. C.
Illinois Society of Clinical L. T.			Edna H. Murmann, M.T.
1944-'45	aff.	semi-ann.	3924 N. Monticello Ave.
Pres.—Fannie Warnock			Chicago, Ill.
Indiana State Society of M. T.			Hazel M. Childs, M.T.
1943-'44	aff.	annual	Indianapolis City Hosp.
Pres.—Virginia Sue Alley			Indianapolis, Ind.
Inland Empire Society of M. T.			Lenore De Vor
1943-'44	non-aff.	annual	East 547 Gordon
Pres.—Frances Premo			Spokane, Wash.
Little Rock Society of M. T.			Lila Church
1943-'44	non-aff.	quart.	2116 Orange Street
Pres.—Marcella Drilling			Little Rock, Ark.
Minnesota Society of M. T.			Thelma Erickson, M.T.
1944-'45	aff.	annual	1211 East 4th Street
Pres.—Mr. Chauncey Winbigler			St. Paul 6, Minn.
Nebraska Society of M. T.			Mary H. McMillan, M.T.
1943-'44	aff.	annual	434 Aquila Court
Pres.—Wilma Eicher			Omaha, Nebr.
New Hampshire Society of M. T.			Marion P. MacMartin, M.T.
1943-'44	aff.	annual	Mary Hitchcock Mem. Hosp.
Pres.—Sister Marie-Rose (Larivee)			Hanover, N. H.
Niagara Frontier Association of M. T.			Mrs. Angela Auer, M.T.
1943-'44	aff.	monthly	16 Duerstein Ave.
Pres.—Wilma Riehle			Buffalo, N. Y.

Name of State or Local Society	A.S.M.T. Affiliation	Meetings	Secretary's address
Ohio Society of M. T. (Akron) 1943-'44 Pres.—Kathryn Teeple	aff.	annual	Mary Benedict Clark, M.T. Nichols General Hosp. Louisville, Ky.
Ohio Society of Clinical L. T. Dist. #1 1944 Pres.—Jean Jones	non-aff.	semi-ann.	Patricia Nelan, M.T. c/o City Hospital Akron, Ohio
Oklahoma Society of M. T. 1944 Pres.—Marie Clark	aff.	semi-ann.	Leilla Woodworth, M.T. 604 S. Cincinnati Tulsa 3, Okla.
Omaha-Council Bluffs Society of M. T. 1943-'44 Pres.—Kathern Belle Forest	non-aff.	bi-mo.	Josephine Benal, M.T. City Health Dept. City Hall, Omaha, Nebr.
Pennsylvania Society of M. T. 1943-'44 Pres.—Doris Hildreth Bradway	aff.	monthly	Elsa Richter Lynch, M.T. 7203 Gresheim Road Philadelphia, Pa.
Savannah Society of M. T. 1943-'44 Pres.—Sadie Cartwright	aff.	monthly	Jurelle S. Hooper, M.T. 20 East 56th Street Savannah, Ga.
Tulsa Round Table of M. T. 1944 Pres.—Oscar Stewart	non-aff.	bi-mo.	Lythene Vermillion, M.T. Hillcrest Memorial Hosp. Tulsa, Okla.
Wisconsin Association of M. T. 1943-'44 Pres.—Alice A. Thorngate	aff.	semi-ann.	Mrs. Elizabeth Kullman, M.T. 2460 South 59th Street Milwaukee 14, Wisc.
Wisconsin Association of M. T. Milwaukee District, 1943-'44 Pres.—Dorothy Zoeller	aff.	monthly	Esther Lemont, M.T. 2618 North Summit Ave. Milwaukee 11, Wisc.

Key: (aff.—affiliated with A. S. M. T.)
(non-aff.—not affiliated with A. S. M. T.)
(semi-ann.—semi-annual)
(bi-mo.—bi-monthly)
(quart.—quarterly meetings)

CECELIA M. KORTUEM, R.N., M.T. (ASCP)
Editorial Staff
American Journal of Medical Technology

The Journal of Medical Technology is a Bi-monthly publication, therefore, it will be necessary for the Program Committees of the Societies, State and Local, to follow the schedule suggested below, to assure proper publicity in this department of the Journal.

By OCTOBER 10th send to me your program for November, December and January, this will appear in the November Number.

By DECEMBER 10th send to me your program corrected or revised for January together with your program for February and March to appear in the January Number.

By FEBRUARY 10th send to me your program, corrected or revised for March together with your program for April and May, to insure appearance in the March Number.

By APRIL 10th send to me your program, corrected or revised for May together with your program for June and July, to appear in the publication for May.

By JUNE 10th send to me your program for September, and if possible for October and November or the year's tentative program together with the list of officers to hold office in the coming year. This will appear in the July Number of the Journal.

By AUGUST 10th send to me your program, corrected or revised for September together with your programs for October and November. This will appear in the September Number of the Journal.

From here the cycle repeats itself. It does not seem too much to expect as all organizations have to look and plan in terms of the future.

This department of the Journal of Medical Technology can only succeed as a result of your cooperation.

Address all communications to:

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